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Connect your build

Choose your route. Plan the wiring. Know what is supported.



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Start with what is already in the car

You do not need to replace every gauge or controller to use FusionDrive. Start by bringing compatible measurements together. Add supported permission or setpoint control where the existing device provides the right interface. Replace a controller only when the new installation covers the functions and electrical requirements that you actually use.

FD Design LS · V1 beta Local review draft 1.2 · 12 September 2026

This library is a local review edition for **FD Design LS**, the beta board with two low-side AUX outputs. It is not for the older high-side-AUX design. No wiring combination in these books is certified by a manufacturer or proven on delivered beta hardware by this document work.

1.1 The two routes

Keep and integrate: the existing controller keeps its pump/solenoid driver, tune and internal safeguards. FD reads compatible evidence and may provide an additional permission, a documented scramble input or setpoint change. A single wire does not reveal all of the controller's settings or reasons.

Replace its control function: FD drives a compatible load directly from its built-in OUT power stage and uses its own saved configuration. The old controller must be removed from that load circuit. Retain required sensing/protection electronics. An extra power stage is needed only where capacity or the electrical drive requires it.

1.2 Your library

Book	Read this when you want to...
01 - Keep your boost controller	Retain an EBC and add supported setpoint/scramble control or monitoring
02 - Bring boost control into FD	Reuse a qualified solenoid and configure FD boost control
03 - Keep your water/meth controller	Preserve the fluid controller; add measurements and a documented permit
04 - Bring water/meth control into FD	Design a compatible pump/driver and measured protection setup
05 - Keep your nitrous controller	Add permission while preserving native WOT/RPM and stage logic
06 - Bring nitrous control into FD	Map stages, separate fuel curves, gates and compatible FD outputs
07 - Keep your sensors and gauges	Connect documented logging outputs and accessory CAN
08 - Replace the display, keep the measurement	Use direct sensors or retained signal-conditioning electronics

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Match the exact product

These are named-model guides, not a claim to cover every controller sold or to rank the market. A common brand, connector or preset name is not enough. Match the part number, generation, hardware/firmware and manual revision before following a connection.

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2.1 Boost coverage

Turbosmart eBoost2, eBoost3 and eBoost Street; GFB G-Force III; AEM Tru-BoostX; GReddy Profec OLED, optional Profec MAP and Profec B-Spec II; HKS EVC6-IR2 and EVC-S2; Apexi AVC-R. Some have a documented ground-switch input; some need an interface or have no verified remote-control path. Use the model chapter's result rather than assuming they all support group selection.

2.2 Water/meth coverage

AEM internal-MAP 30-3300 and multi-input 30-3305 families; Snow VC-30, VC-50, Stage 3 310 and direct-injected 320; Aquamist HFS3/HFS4; Coolingmist CMGS System X/FCB and Cool Boost Stage II V2. DevilsOwn DVC-30 is an explicit evidence gap: independent FD measurement is the current route, not a released controller pinout.

2.3 Nitrous coverage

NOS Mini 15974NOS and current 25974NOS, NOS Launcher, Nitrous Express Maximizer5/6, Nitrous Outlet ProMax 00-61002 and progressive/window 00-61001, NOS 15982NOS, NX 18959, NX 18961 and NX 15961. Secondary inputs, status outputs, restart logic and stage count differ; their chapters identify the differences.

2.4 Gauges and sensors

AEM Bosch X-Series 30-0300, AEM 30-0301 pressure gauge, Innovate LC-2 and MTX-L PLUS, AutoMeter analog wideband matched to 2650-1469 Rev B, Defi ADVANCE Control Unit SE, AEM stainless 30-2130-150 and AEM 30-2310 Inline. Generic sensor chapters cover what a conditioned temperature, flow, switch or frequency source needs before it can connect.



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Know the FD Design LS connectors

The tables below identify electrical functions. They are not a mating-face drawing. Confirm actual cavity markings and the harness drawing: looking into a plug and looking into its mating socket mirrors the apparent layout.

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J6 pin	Function	Electrical role
1	Dedicated fused +12 V feed	Heavy-output feed; verify actual supply with a meter
2	AUX1	Nominal 1 A-class low-side ground sink
3	IGN	Sense/wake input, not a physical master interlock
4 / 7	Power ground	Rated return; keep motor current out of sensor ground
5 / 6	CAN2 H / CAN2 L	Separate accessory bus pair
8	AUX2	Nominal 1 A-class low-side ground sink
9 / 10 / 11 / 12	OUT4 / OUT3 / OUT2 / OUT1	High-side switched +12 V outputs

J8 pin	Function	Electrical role
1 / 2 / 3	IN1 / IN2 / IN3	Conditioned 0-5 V ADC
4	Sensor +5 V	Qualified sensor supply; do not parallel another supply
5 / 6 / 7	IN4 / IN5 / IN6	Conditioned 0-5 V ADC
8	Sensor ground	Sensor/signal reference, not motor return

The four high-side outputs share a 30 A fused path. That is not a per-channel rating or proof of continuous, hot-enclosure, simultaneous inductive performance. Check actual assembled-board limits. AUX channels are not isolated contacts, positive-voltage outputs, DACs or pump supplies.

The LS feed backfeed behaviour can create a misleading heavy-rail indication when the dedicated feed is absent. Verify J6 feed physically before commissioning. Never use a telemetry voltage or an illuminated device as proof the output feed is correctly wired.

FD source: docs/V1_LS_HARDWARE_LIMITATIONS.md; current HardwareMap definitions. Pinout is specific to FD Design LS Rev A-LS / schematic 5-LS.

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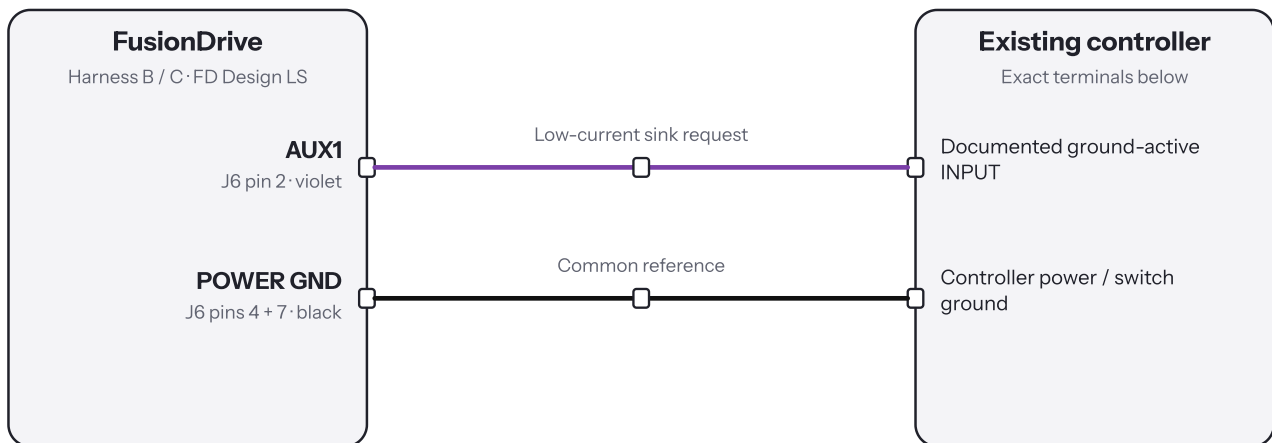
Pick the right interface

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4.1 Ground-trigger input

An AUX sink can act on a documented ground-active control input only when voltage, input current, reference ground and power sequencing are compatible. The controller input must not become backpowered through FD when either unit is off. For an isolated switch requirement, use actual isolated contacts instead.

E-01 | Documented ground-trigger input



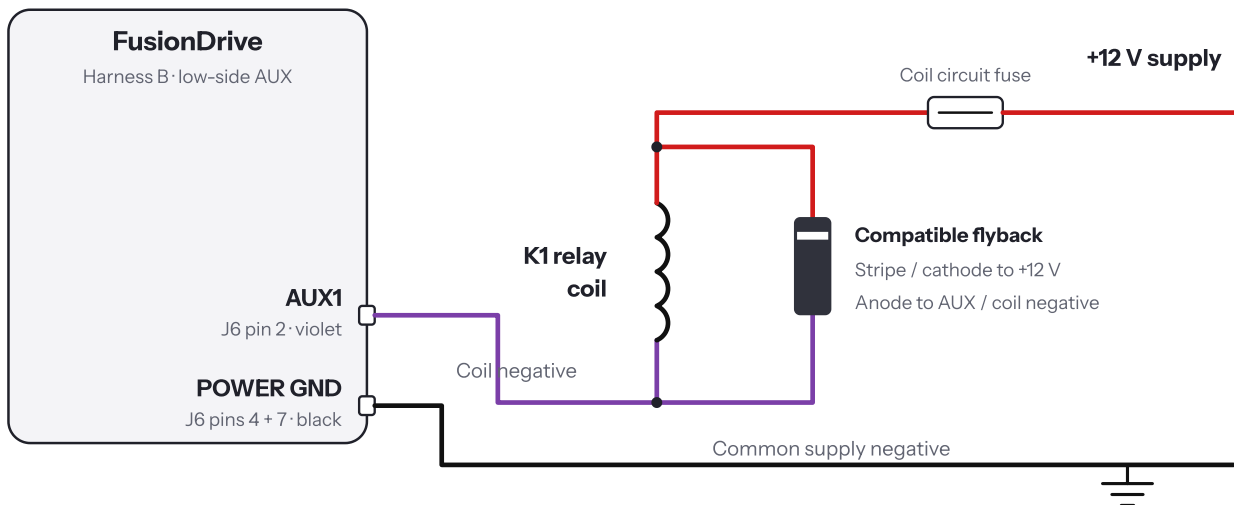
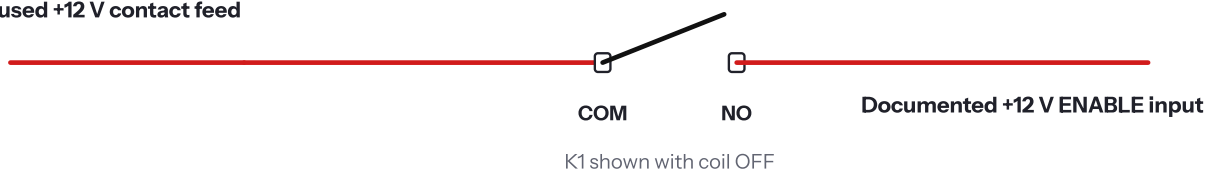
Wire colours: FD loom at left; documented accessory wire at right. Small sleeve = insulated splice.

Connector positions here are logical; use the mating-face drawings to locate FD cavities.

AUX ON sinks the input to ground. Verify input voltage, current and behaviour with either unit unpowered.

4.2 Positive trigger or discrete series permission

Use a qualified isolated relay/interface. A low-current relay coil can be an AUX load after its current, suppression and power states are checked; the isolated contact then supplies the controller's required positive or ground request. A safety permission contact goes in series with the native discrete request, not across it.

E-02 | Isolated +12 V permission**K1 CONTACTS · electrically isolated from the coil****Fused +12 V contact feed**

Coil and contact circuits remain separate. A mechanical relay is binary only: 0% or 100%.

NO closes only when energized; OFF interrupts the permitted path.

Match coil current, suppression polarity and contact ratings to the selected relay before installation.

Qualified automotive interface only; these labels do not imply an internal connection between coil and contacts.

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Plan all outputs together

The same six output channels are shared by boost, EBC, WMI, nitrous, generic accessories and alarms. A feature being available in a menu does not create another physical output.

Example	Channel demand	What to check
Two-wire eBoost group control	Both AUX channels	No spare AUX for a WMI permit
Internal boost + WMI	Usually two commands	Load drivers, pressure source and any extra valve/permit
One wet nitrous stage	Two commands	Separate nitrous and fuel load paths
Two wet stages + boost + WMI	Six commands	No output left for retard, alarm or extra valve
Three wet stages	Six commands	At least two commands need compatible AUX driver interfaces
External retard request	One command	Receiver must actually implement timing; FD does not drive ignition coils

5.1 Powered status output

Read it through the correct input receiver. Never connect an accessory status OUTPUT to an FD AUX OUTPUT. A low-side status wire may rise to its load supply when off, so the phrase ground output does not make it a safe 0-5 V input.

5.2 Solenoid or pump

Choose a driver for the load. A source-switching high-side output and a return-switching low-side output are different circuits. Do not keep both controllers connected. Do not use a mechanical relay as a progressive PWM driver. A clamp arrangement that is suitable for a relay may be wrong for a fast nitrous solenoid.

5.3 Allocation worksheet

Channel	Assigned function / exact device	Driver and off-state
OUT1 - J6/12	_____	_____
OUT2 - J6/11	_____	_____
OUT3 - J6/10	_____	_____
OUT4 - J6/9	_____	_____
AUX1 - J6/2	_____	_____
AUX2 - J6/8	_____	_____

For each used channel also record fuse, cable, connector, PWM frequency, maximum current at temperature, simultaneous loads and suppression. Do not parallel FD outputs or move a heavy load to AUX merely because the app permits a name.



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Configure on FD, verify from FD

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Current app workflow: Configure this installation from its function in Settings. Controls provides live actions and the Dashboard provides glance controls; use a card's edit menu to return to setup. A configured output remains visible even when disabled. Enabled rules operate their assigned enabled outputs automatically; there is no extra output mode to select. Live Off, On or duty takes over a generic output until you choose Resume automation. Setup keeps the electrical limits, calibration and response settings. Assigned boost, WMI and nitrous outputs use their controller-specific actions, preserving sensor protections and any paired fuel/stage logic. Nitrous Arm allows its configured activation conditions to operate; it is not an unconditional spray command.

Setup and vehicle data: Starting presets remain editable; Add Sensor includes calibration and fine tuning before Create. Use dedicated IGN, fresh running-engine OBD evidence, or both for vehicle activity; a dedicated IGN wire is optional when valid OBD evidence is available. If the pressure hose is unused, explicitly select OBD pressure in setup. A valid atmospheric sensor reading cannot identify a disconnected hose. These app choices do not change the product-specific electrical compatibility or limitations described below.

Settings and rules must be saved to the ESP so the installed system can operate without the phone. The phone and Cloud are configurators and viewports. Logs are recorded on the phone and can be backed up; there is no promise to recover samples never received by the phone.

- 1 Connect to the correct real device and confirm serial/board identity. Demo mode is for navigation, not commissioning evidence.
- 2 Configure measurements first. Name the actual quantity, physical location and origin. Verify units, calibration and update age; test missing and faulted signals.
- 3 Configure the output's electrical role, frequency, minimum/maximum and ramp settings. A preset name is not confirmation that every numeric field was replaced.
- 4 Choose the controller mode and output assignment. Use exactly one owner per output. Nitrous → Keep my controller links to the relevant input, output and automation setup. It does not configure the external controller's native shot algorithm.
- 5 Save every relevant section, wait for success and reload the stored configuration. Compare returned values to the worksheet.
- 6 Reboot with loads isolated, then disconnect the phone. Verify the stored system and intended safe state on the actual device. Some safety enables require deliberate rearming; an automation can change that, so review the complete ruleset.

6.1 Timing belongs to the entire measurement path

ADC acquisition, a conditioner, accessory update rate, CAN/OBD traffic and controller scheduling all contribute to response. A nominal rule rate or requested phone-log rate does not establish physical reaction time. Do not replace a fast independent tach/window circuit with a slow PID just because both display RPM.

6.2 Core app source references

Sensor configuration: `SensorsView.swift`. Accessory CAN: `CANBusConfigurationView.swift` and `CANDecodeEditorView.swift`. Output configuration: Outputs feature. Local rules: `AutomationEditorView.swift`. Dedicated boost/WMI/nitrous functions: their respective control views and ESP modules. The source snapshot and hashes are archived with this library; labels may change in later releases.



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Make the log useful to a tuner

Build the record around four kinds of evidence:

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- **Measured:** actual manifold/fuel/bottle/line pressure, conditioned flow, wideband lambda, temperatures and available ECU signals.
- **Requested:** target boost, requested WMI/nitrous duty and permission commands.
- **Reported:** a controller's own duty reference, alarm or valid-status bit, where documented.
- **Events:** rule activation/release, controller state, fault, prime, profile change and operator marker where exposed.

Do not give these the same name. Requested 100% is not measured delivery. A two-wire group pulse records FD's intended group change, not a confirmed external group. One total flow sensor cannot prove that each branch nozzle flows correctly.

In Data Log settings, choose channels and active/idle rates, then inspect achieved rate and gaps during the actual test. Raw CAN capture is a separate bounded recording feature; configure its bus/filters/capacity deliberately. Preserve source units, calibrations and configuration identity with every session.

Intelligence can examine the recorded evidence and surface useful trends and questions. It does not turn missing sensors into measurements, guarantee a fault prediction or authorise a more aggressive tune. The tuner must be able to inspect the signals behind a conclusion.

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Commission in stages

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8.1 Stage 1 - identification and design

Record product labels, manuals, original settings, complete circuit, selected interfaces and everything that will be removed. Resolve unverified pinouts and load specifications before building a harness. Keep a restoration plan.

8.2 Stage 2 - electrical bench test

Use protected supplies, qualified dummy loads and suitable instruments. Confirm every power state, input range, ground reference, coil/load current, suppression, PWM and safe OFF behaviour. Check the original controller's gates with FD permission both on and off.

8.3 Stage 3 - complete measurement chain

Stimulate the actual sensor or use a traceable reference. Verify calibration, source freshness, fault codes, open wires, power loss and interface delay. Do not mistake a voltage injected at FD for a test of the external sender/controller.

8.4 Stage 4 - fluid/actuator rig

For WMI/nitrous, keep delivery out of the engine and use the kit's safe isolation/test method. Confirm pressure, actual flow, valve closure and coherent fuel/nitrous stop. For boost, verify fail-safe plumbing and pressure response on suitable equipment before engine load.

8.5 Stage 5 - controlled vehicle validation

A qualified installer/tuner validates the complete tune and response under controlled conditions. Record measured reaction time, electrical/thermal margin, operating envelope and unmapped functions. One successful bench state does not validate every combination.

8.6 Acceptance is evidence, not a tick from this manual

The local QA records for this library prove document generation, source review and layout checks. They do not claim hardware integration tests, full ESP emulation, a dyno result or manufacturer approval. Those records must be created during commissioning of the actual combination.



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Open items before customer release

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Item	Current disposition
LS continuous/thermal/inductive output envelope	Physical qualification still required; no universal pump/solenoid approval
eBoost/GFB/AEM/Apexi named presets	Follow manual-specific settings; preset names alone are not validated mappings
Exact nitrous PWM frequency entry	Current app stepper may not reach an arbitrary value; verify a supported configuration path
External WMI mode	Requires a fresh external demand source; flow/level alone is insufficient
Raw analog and CAN fault meanings	Bind/qualify validity explicitly; a linear decoder cannot infer every fault code
Aquamist current complete pin verification	Retain system; do not transfer a legacy pinout to v3.2
DevilsOwn DVC-30	Current trustworthy manual not retrieved; no released direct pinout
Defi proprietary integration	No direct generic interface established; independent measurement route
Universal controller replacement	Not established; AFR servo, specialised fluid-valve strategies and other functions may remain unmatched

9.1 Add a model to this library

Obtain the exact official manual and record the interface direction, connector view, voltage/current, active polarity, timing, output transfer, load driver ratings and failure states. Map each requested FD function to a documented input/output. If a supplier answer is needed, request the technical detail without assuming the brand endorses FD.



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Local evidence and document control

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The full package is stored under docs/accessory-integration in the local FD V3 project. It includes PDF manuals, editable manuscripts, an original vector-layout builder, model dossiers, official-source links and available downloaded manuals, build hashes and document-review records. Source-document copyright remains with each manufacturer; the FusionDrive diagrams and integration procedures are independent work.

Manufacturer documents are cited beside the relevant model facts, with revision/page detail where available. Some Coolingmist technical manuals are hosted by an identified authorised dealer; unavailable full current Aquamist and DVC-30 material is explicitly marked. No source absence has been filled with a guessed wire colour.

This task creates manuals only. It does not publish them, modify controller firmware, change app presets, deploy the portal or configure a user's vehicle. Any implementation gap found during the manual review is recorded for a separate change and validation pass.

Revision 1.2 - 12 September 2026. Local review edition. Review brand presentation and product scope first; then complete the model-specific hardware qualification before customer installation release.

10.1 Installation review record

Record	Entry
Vehicle / installer / date	_____
FD serial / board / firmware / app	_____
Accessory model / hardware / firmware	_____
Official manual / revision / page	_____
Retain or replace; unmapped functions	_____
Circuit / connector / calibration files	_____
Bench / fluid / dyno evidence references	_____
Release decision / reviewer	_____



Questions?

Documentation · fusiondrive.io/docs

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Review copy · [Local FD V3 installation library](#)

FusionDrive switches real current to real loads and can control boost, water/methanol injection and nitrous. Fuse every feed and every load, respect the ratings in the specifications, and set failsafes before you drive. Configure and tune with the vehicle stationary. The installer is responsible for compliance with local vehicle regulations. Local review draft. These accessory installations have not received physical compatibility sign-off or manufacturer approval. Follow the exact-model qualification and commissioning steps in this guide before use. Match the exact model, generation, connector and manual revision. Terminal labels identify electrical connections, not connector mating-face or cavity order. Follow cavity markings and the official harness view; do not wire by colour alone. Manufacturer names identify equipment only. These independent FD instructions do not replace the manufacturer's manual.